IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **He et al.**

Serial No.: **10/779,492**

Filing Date: **February 13, 2004**

For: **Adhesive containing radial block copolymer**

Confirmation No.: **8063**

Group Art Unit: **1796**

Examiner: **Peter D. Mulcahy**

Attorney Docket No.: **N-3074.NWN-US**

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Commissioner for Patents
P.O. Box 1450
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Sir:

APPELLANT'S BRIEF PURSUANT TO 37 C.F.R. § 41.37

This brief is being filed in support of Appellant's appeal from the final rejections of claims 1-4, 6-9, 11-14, 16 and 17, dated March 15, 2010. A Notice of Appeal was filed on June 15, 2010.

1. REAL PARTY IN INTEREST

The real party in interest is Henkel AG & Co. KGaA.

2. RELATED APPEALS AND INTERFERENCES

Appellant is not aware of any related appeals and interferences. See appendix entitled RELATED PROCEEDINGS APPENDIX. The Board is directed to the appeals relating to copending commonly assigned application Serial Nos. 10/779,505, as listed in the Related proceedings appendix.

3. STATUS OF CLAIMS

Pending: Claims 1-4, 6-9, 11-14, 16 and 17

Rejected: Claims 1-4, 6-9, 11-14, 16 and 17

Cancelled: Claims 5, 10 and 15

Objected to: none

Allowed: none

Withdrawn: none

Appealed: Claims 1-4, 6-9, 11-14, 16 and 17

Appeal Withdrawn: none

4. STATUS OF AMENDMENTS

Claim amendments filed subsequent to the final rejection dated January 25, 2010 were entered and stand rejected.

5. SUMMARY OF CLAIMED SUBJECT MATTER

In one aspect, and as reflected in independent claim 1, the claimed inventions are generally directed to a hot melt adhesive. The adhesive comprises, as required components, (i) a radial block copolymer component comprising $(PS\text{-}PI)_nX$ wherein PS is polystyrene and PI is polyisoprene, X is the residue of a multifunctional coupling agent used in the production of the radial block copolymer, and n is equal to or greater than 3 and represents the number of PS-PI arms appended to X, and wherein the styrene content of the radial block copolymer is from 25 wt % to about 50 wt %, (ii) a linear triblock copolymer, (iii) a tackifying resin, and (iv) a liquid plasticizer. Based on the weight of the adhesive composition, the radial block copolymer component is present in amounts of less than 15 wt %, the linear triblock copolymer is present in amounts of up to about 20 wt %, the tackifying resin is present in amounts of from about 30 to about 70 wt %, and the plasticizer is present in amounts of from about 10 wt % to about 20 wt %. The claimed adhesive must be suitable for use as an elastic attachment adhesive. [Page 2, lines 9-16. Page 3, lines 6-10.]

In another aspect, and as recited in independent claim 17, the claimed inventions are directed to a hot melt adhesive. The adhesive comprises, as required components, from about 3 wt% to less than 15 wt% of a radial block copolymer component [page 3, line 27] comprising $(PS\text{-}PI)_nX$ wherein PS is polystyrene and PI is polyisoprene, X is the residue of a multifunctional coupling agent used in the production of the radial block copolymer, and n is equal to or greater than 3 and represents the number of PS-PI arms appended to X [page 3,

lines 14-17], and wherein the styrene content of the radial block copolymer is from 25 wt% to about 50 wt% [page 3, lines 21-23]; (ii) from about 1 wt% to about 20 wt% of a linear triblock copolymer [page 4, line 26 to page 5, line 2]; (iii) from about 30 wt% to about 70 wt% of a tackifying resin [page 1, line 24; page 2, lines 12-13; page 5, line 3]; (iv) from about 10 wt% to about 20 wt% of a liquid plasticizer [page 2, line 1; page 2, line 13]. The claimed adhesive must be suitable for use as an elastic attachment adhesive [page 2, lines 3-8; page 10 line 25 to page 11, line 6].

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The first issue on appeal is:

- whether, at the time of filing, one of ordinary skill in the art would have found the invention recited in claims 1-4, 6-9, 11-14 and 16 obvious under 35 U.S.C. § 103(a) over KUEPPERS (U.S. 5,939,483) (U.S. Patent 5,939,483, hereinafter "Kueppers") in view of DIEHL et al. (U.S. Patent 5,292,819, hereinafter "Diehl").

Also on appeal is the question of:

- whether, at the time of filing, one of ordinary skill in the art would have found the invention recited in claim 17 obvious under 35 U.S.C. § 103(a) over Kueppers in view of Diehl.

7. ARGUMENT

Rejection of Claims 1-4, 6-9, 11-14 and 16 under 35 U.S.C. § 103(a) over Kueppers in view of Diehl

The inventions recited in claims 1-4, 6-9, 11-14 and 16 would not have been obvious to those of ordinary skill because there is no reason to believe that a person of ordinary skill in the art having knowledge of the cited references (but not Appellant's disclosure) would have combined their respective disclosures in the particular manner proposed by the Examiner.

Kueppers is cited by the Examiner as teaching hot melt adhesives comprising 10-40% $(PS\text{-}PI)_X$, triblock polymer, tackifiers and plasticizers in the Appellant's claimed ranges (Office Action dated March 15, 2010, page 2, paragraph 4). While acknowledging that

Kueppers's adhesive is intended for use in packaging applications, the Examiner has maintained that this adhesive may well be suitable for use as an elastic attachment adhesive (*Id.*). To cure this defect, the Examiner applies Diehl.

Diehl is cited as teaching adhesive compositions, made of block polymers, tackifiers and plasticizers, for use in diaper applications, packaging and carton sealing (*Id.* page 3, paragraph 5). The Examiner has maintained that adhesives useful in packaging applications can be used in diaper and elastic attachments, given the art recognizes properties that make these adhesives suitable for both packaging and elastic attachment as evidenced by the disclosure in Diehl (*Id.*).

Thus, the Examiner has asserted that it would have been obvious to modify the packaging adhesive composition to render it suitable for elastic attachment (*Id.* pages 3-4, paragraph 6).

Kueppers describes an adhesive used in packaging applications that can maintain heat resistance while applied at low application temperatures. Kueppers teaches that low temperature application hot melt adhesive requires lower melting raw materials, and the resultant adhesive typically have low heat resistance (Kueppers, col. 1, line 61 to col. 2, line 2). Kueppers further teaches that the use of high molecular weights of block copolymers makes it difficult to obtain viscosities low enough for application on packaging equipment, but decreasing the amount of block copolymer used in the adhesive decreases flexibility at low temperature (*Id.*, lines 47-52). Even with this challenge, Kueppers have discovered, surprisingly, the ability to achieve low viscosity at low temperature while maintaining acceptable heat resistance (*Id.* lines 52-55). Kueppers's adhesives have viscosity less than about 5000cP, preferably less than 3000cP, more preferably less than 1500cP, and even more preferably less than 1000cP at 155°C (*Id.*, col. 8, lines 14-20). The use of such low viscosity adhesive is also allows for fast rate of set, less than about 1 minute, or less than 30 seconds or 20 seconds or even less than 15 seconds (*Id.* col 4, lines 1-5).

However, nothing in Kueppers teach or suggest that mere manipulation of the viscosity would make this packaging adhesive be suitable for use as an elastic attachment adhesive. Elastic attachment adhesives are useful with materials with stretchability and elasticity that is characterized as having high percent elastic recovery. Kueppers, instead, is directed to a low viscosity packaging adhesive that has fast setting and heat resistance. Mere

viscosity manipulation of this packaging adhesive would not render it a suitable elastic adhesive.

In response the Examiner has maintained that the composition ingredients and relative amounts shown in Kueppers are well within the art to manipulate viscosity and to formulate within the scope of the claims. The Examiner has further noted there is no viscosity limitation claimed. While Appellant acknowledges that there is no viscosity limitation recited in the claims, the claims do recite that the adhesive be formulated so as to be suitable for use as an elastic attachment adhesive. First, Kueppers fails to disclose or suggest an adhesive suitable for elastic attachment that comprises a $(PS\text{-}PI)_nX$ radial block copolymer having a styrene content of 25-50 wt % in amounts of less than 15 wt % in combination with up to 20 wt % of a linear triblock, a about 30-70 wt% of a tackifying resin and about 10-20 wt% plasticizer.

More importantly, Kueppers, by its own admission, teaches away from the teachings of Diehls's adhesive. Kueppers teaches that Diehls's adhesive is directed towards a pressure sensitive adhesive, and hence it is slow to set and lacks the heat resistance required for packaging application (Kueppers, col. 2, lines 45-52). In column 8, lines 7-14, Kueppers teaches that unlike its fast setting adhesive, pressure sensitive hot melt adhesive, e.g. Diehl, have indefinite open time. Hence, there is no motivation or suggestion to look to Diehl's pressure sensitive hot melt adhesive to modify the viscosity of Kueppers's adhesive, let alone to look to a pressure sensitive hot melt adhesive for use as a fast setting, low viscosity adhesive. Hence, there is no suggestion or teaching that the packaging adhesive of Kueppers can be manipulated to be suitable for use as an elastic attachment adhesive.

Furthermore, Diehl fails to teach the presence of a linear triblock copolymer in the adhesive. Diehl is completely silent as to the use of a linear triblock copolymer in conjunction with a radial block copolymer. Moreover, Diehl's pressure sensitive adhesive comprises 15-35 wt%, preferably 20-30 wt% of the radical block copolymer, and exemplifies 24.8wt% radical block copolymer in the Examples (Diehl, col 5, lines 31-33; and Table). Unlike Diehl, the adhesive of the invention requires the presence of a linear triblock polymer and less than 15 wt% of a radial block copolymer. As exemplified, use of less than 15 wt% $(SI)_n$ along with linear block copolymer gives good creep performance for the elastic attachment adhesive (see Specification, Table 1 and page 13, lines 1-2). Nothing in Kueppers

and Diehl, either alone or in combination suggests or teaches that the fast setting low viscosity packaging adhesive can be manipulated to be used as an elastic adhesive.

Claims 1-4, 6-9, 11-14 and 16 are directed to hot melt adhesives that are suitable for use as an elastic attachment adhesive. The adhesives comprise specific amounts of a $(PS-PI)_nX$ radial block copolymer component, a linear triblock copolymer component, a tackifying resin component, and a liquid plasticizer component. The above particular combination is suitable as elastic attachment adhesives due to its viscosity and creep performance. Exemplary viscosity of an elastic attachment adhesive, as set forth in Table 1 (page 13 of applicants' specification), is about 6000cP at 300°F (150°C). Also, exemplary average creep percent of an elastic attachment adhesive, as set forth in Table 1 (page 13 of applicants' specification), is calculated as 4.8%.

For at least the foregoing reasons, Appellant submits that the Examiner's rejection of claim 1-4, 6-9, 11-14 and 16 as obvious under 35 U.S.C. § 103(a) in light of the cited prior art is improper and should be vacated. Accordingly, Appellant respectfully requests that the Board withdraw the rejection and pass claim 1 and all claims dependent thereon to allowance.

Rejection of Claim 17 under 35 U.S.C. § 103(a) over Kueppers in view of Diehl

Claim17 stands rejected under 35 U.S.C. § 103(a)for alleged obviousness over the Kueppers in view of Diehl. Examiner has asserted that it would have been obvious to modify the adhesive composition to render it suitable for elastic attachment, as well for packaging (Office action dated March 15, 2010, pages 3-4, paragraph 6). The inventions recited in claim 17 would not have been obvious to those of ordinary skill because there is no reason to believe that a person of ordinary skill in the art having knowledge of the cited references (but not Appellant's disclosure) would have combined their respective disclosures in the particular manner proposed by the Examiner.

Nothing in Kueppers teach or suggest that mere manipulation of the viscosity would make this packaging adhesive be suitable for use as an elastic attachment adhesive. Elastic attachment adhesives are useful with materials with stretchability and elasticity that is characterized as having high percent elastic recovery. Kueppers is directed to a low viscosity packaging adhesive that allows has fast setting and heat resistance.

Kueppers fails to disclose or suggest an adhesive suitable for elastic attachment that comprises a $(PS-PI)_nX$ radial block copolymer having a styrene content of 25-50 wt % in

amounts about 3-15 wt % in combination of about 1-20 wt % of a linear triblock, about 30-70 wt % of a tackifying resin and about 10-20 wt% of a liquid plasticizer.

Kueppers, by its own admission, teaches away from the teachings of Diehls's adhesive. Kueppers teaches that Diehls's adhesive is directed towards a pressure sensitive adhesive, and hence it is slow to set and lacks the heat resistance required for packaging application (Kueppers, col. 2, lines 45-52). In column 8, lines 7-14, Kueppers teach that unlike its fast setting adhesive, pressure sensitive hot melt adhesive, e.g. Diehl, have indefinite open time. Hence, there is no motivation or suggestion to look to Diehl's pressure sensitive hot melt adhesive to modify Kueppers's adhesive, let alone to look to a pressure sensitive hot melt adhesive for use as a fast setting, low viscosity adhesive. The viscosity of the Kueppers adhesive, typically less than about 1500 cps at about 150°C. See Table 1 (col. 10). In contrast, applicants' formulation set forth in Table 1 (page 13 of applicants' specification) shows a viscosity at 300°F (150°C) of 6,000cP. Hence, there is no suggestion or teaching that the packaging adhesive of Kueppers can be manipulated to be suitable for use as an elastic attachment adhesive.

Furthermore, Diehl fails to teach the presence of a linear triblock copolymer in the adhesive. Diehl is completely silent as to the use of a linear triblock copolymer in conjunction with a radial block copolymer. Moreover, Diehl's pressure sensitive adhesive comprises 15-35 wt%, preferably 20-30 wt% of the radical block copolymer, and exemplifies 24.8wt% radical block copolymer in the Examples (Diehl, col 5, lines 31-33; and Table). Unlike Diehl, the adhesive of the invention requires the presence of a linear triblock polymer and less than 15 wt% of a radial block copolymer. As exemplified, the use of less than 15 wt% $(SI)_n$ along with linear block copolymer gives good creep performance for the elastic attachment adhesive (see Specification, Table 1 and page 13, lines 1-2). Nothing in Kueppers and Diehl, either alone or in combination, suggests or teaches that the fast setting low viscosity packaging adhesive can be manipulated to be used as an elastic adhesive.

For at least the foregoing reasons, Appellant submits that the Examiner's rejection of claim 17 as obvious under 35 U.S.C. § 103(a) in light of the cited prior art is improper and should be vacated. Accordingly, Appellant respectfully requests that the Board withdraw the rejection and pass claim 1 and all claims dependent thereon to allowance.

Conclusion

In view of the foregoing, Appellant requests that this patent application be remanded to the Examiner with an instruction to withdraw the rejection of claims 1-4, 6-9, 11-14, 16 and 17 under 35 U.S.C. § 103(a).

Respectfully submitted,

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8. CLAIMS APPENDIX

The following claims are involved in the present appeal:

1. A hot melt adhesive comprising

a radial block copolymer component comprising $(PS-PI)_nX$ wherein PS is polystyrene and PI is polyisoprene, X is the residue of a multifunctional coupling agent used in the production of the radial block copolymer, and n is equal to or greater than 3 and represents the number of PS-PI arms appended to X, and wherein the styrene content of the radial block copolymer is from 25 wt % to about 50 wt %

a linear triblock copolymer,

a tackifying resin, and,

a liquid plasticizer,

wherein, based on the weight of the adhesive composition, the said radial block copolymer component is present in amounts of less than 15 wt %, the linear triblock is present in amounts up to about 20 wt %, the tackifying resin is present in amounts of from about 30 to about 70 wt %, and the plasticizer is present in amounts of from about 10 wt % to about 20 wt %,

said adhesive being suitable for use as an elastic attachment adhesive.

2. The adhesive of claim 1 in which the number average molecular weight of each PS-PI arm is less than about 160,000.

3. The adhesive of claim 2 wherein the radial block copolymer component has a di-block percentage of less than about 30%.

4. The adhesive of claim 3 wherein the radial block copolymer component has a di-block percentage of less than about 20 %.

5. canceled

6. The adhesive of claim 1 wherein said linear triblock copolymer is styrene-isoprene-styrene, styrene-butadiene-styrene, styrene-isobutylene styrene, styrene-b-ethylene/butylene-b-stryrene, and/or styrene-b-ethylene/propylene-b-styrene.

7. The adhesive of claim 1 wherein the number n is between about 3 and about 6.

8. The adhesives of claim 1 further comprising a wax.

9. An article of manufacture comprising an elastomeric fiber and the adhesive of claim 1.

10. canceled

11. The article of claim 9 which is a disposable elastic article.

12. The article of claim 11 which is a disposable absorbent elastic article.

13. The article of claim 12 which is a diaper.

14. A process for bonding a first substrate to a second substrate comprising applying to at least the first substrate the adhesive of claim 1, bringing at least the second substrate in contact with the adhesive present on the first substrate whereby said first and second substrates are bonded together, wherein at least one of said first substrate or said second substrate is an elastomeric polyurethane fiber.

15. canceled

16. The process of claim 14 wherein one of said first substrate or said second substrate is a nonwoven substrate.

17. A hot melt adhesive comprising

from about 3 wt % to less than 15 wt % of a radial block copolymer component comprising $(PS\text{-}PI)_nX$ wherein PS is polystyrene and PI is polyisoprene, X is the residue of a

multifunctional coupling agent used in the production of the radial block copolymer, and n is equal to or greater than 3 and represents the number of PS-PI arms appended to X, and wherein the styrene content of the radial block copolymer is from 25 wt % to about 50 wt %

from about 1 wt % to about 20 wt % of a linear triblock copolymer,

from about 30 wt % to about 70 wt % of a tackifying resin, and

from about 10 wt % to about 20 wt % of a liquid plasticizer.

said adhesive being suitable for use as an elastic attachment adhesive.

9. EVIDENCE APPENDIX

NONE

10. RELATED PROCEEDINGS APPENDIX

A. Serial No. 10/779,505(currently awaiting decision by the Board of Appeals), filed February 13, 2004 in the names of Qiwei He and Michael G. Harwell. Assigned to Henkel AG & Co. KGaA.